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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/715,263	11/17/2003	Narain D. Arora	SIPRP101US	4577
23623	7590	08/11/2005	EXAMINER	
AMIN & TUROCY, LLP 1900 EAST 9TH STREET, NATIONAL CITY CENTER 24TH FLOOR, CLEVELAND, OH 44114			NGUYEN, JIMMY	
			ART UNIT	PAPER NUMBER
			2829	

DATE MAILED: 08/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/715,263	Applicant(s) ARORA ET AL.	
	Examiner Jimmy Nguyen	Art Unit 2829	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 May 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-45 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 - 36, 39 - 45 is/are rejected.
- 7) ☒ Claim(s) 37 and 38 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>0305</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claims objection

1. Claims 37, 38 are objected to because of the following informalities: what is bfres6 ? where is it defined in specification ? . Appropriate correction is required.

Election/Restrictions

1. Applicant's election with traverse of group I (claims 1 – 31, 43- 45) in the reply filed on 5/24/05 is acknowledged. The traversal is found persuasive because the examiner is hereby re-join all the claims.

Claims Objection

- Claim 17 depends on it self.
- Claim 30 depends on it self.
- Claim 33 depends on it self.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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3. Claims 1 -36, 39 - 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bourgoin et al (US 5,804,709)

As to claims 1, 29, 32, 43, 44, Bourgoin et al disclose (figs 2 – 4) a system and a method that facilitates non-invasive in-line characterization of parameters of VLSI circuit interconnects, comprising:

A voltage source (Vdc) the outputs a plurality of disparate voltages;
a of micro-electro-mechanical system (MEMS, 320) cantilevers that apply voltage to VLSI circuit (231, fig 2A) interconnect without physical contact thereto;
a measuring component (column 9 and 10) that measures deflection characteristics of the cantilevers,
the deflections correspond to electrical forces generated from the applied voltages (Vdc) as passed through VLSI circuit (231) interconnect and
a component that computes characteristics of the VLSI interconnect (**claim 1, measure a characteristic of the sample**) based at least in part upon the measured deflection characteristics.

However, Bourgoin et al disclose only one (MEMS, 320). It would have been obvious to one having ordinary skill in the art at the time of the invention was made to provide the additional MEMS, 320 since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art, St. Regis Paper Co.v. Bemis Co., 193 USPQ 8.

As to claim 2, Borgoin et al disclose (figs 2 – 4) the system further comprising a control component (372) that effectuates control of a VLSI circuit fabrication process step based at least in part upon the computed characteristics.

As to claim 3, Borgoin et al disclose (figs 2 – 4) the system further comprising the computed characteristics are employed as feedback (470) information to the control component.

As to claim 4, Borgoin et al disclose (figs 2 – 4) the system further comprising the computed characteristics are employed as feed forward information to the control component.

As to claim 5, Borgoin et al disclose (figs 2 – 4) the MEMS cantilevers comprise conductive tips (321) to effectuate injection of voltages into the VLSI circuit components.

As to claim 6, Borgoin et al disclose (figs 2 – 4) the MEMS cantilever (320) act as a conductive path to the conductive tips (321).

As to claim 7, Borgoin et al disclose (figs 2 – 4) the system wherein a conductive path is provided on the MEMS cantilevers (320) to the conductive tips to facilitate injection of currents into the VLSI circuit interconnects.

As to claim 8, Borgoin et al disclose (figs 2 – 4) the test structure for capacitance and/or resistance measurement. (claim 1, measuring characteristic of a sample).

As to claim 9, Borgoin et al disclose (figs 2 – 4) the system of claim 1, further comprising a voltage source (V_{dc}) that delivers voltages to the MEMS cantilevers (320) the voltage source delivering disparate voltages to disparate MEMS cantilevers.

As to claim 10, Borgoin et al disclose (figs 2 – 4) the system wherein the measuring component comprising photo-detector (or antenna, 361) that detects a laser beam (323) deflecting off at least one MEMS cantilever (320).

As to claim 11, Borgoin et al disclose (figs 2 – 4) the measuring component comprises an optical interferometer.

As to claims 12, 13, Borgoin et al disclose (figs 2 – 4) the system further comprising a positioning component (scanner) that facilitates proper positioning of the MEMS cantilevers with respect to the VLSI circuit interconnect.

As to claims 14, 15, Borgoin et al disclose (figs 2 – 4) the system further comprising a pre-amplifier and amplifier (462).

As to claims 16 - 19, Borgoin et al disclose (figs 2 – 4) the system further comprising a tuning fork, wherein at least one MEMS cantilever (320) is attached to the tuning fork.

As to claim 20, Borgoin et al disclose (figs 2 – 4) the system at least one MEMS cantilever is a piezo-resistive cantilever (320).

As to claims 21, 22, Borgoin et al disclose (figs 2 – 4) the system employed to measure coupling capacitance between VLSI circuit interconnects and measure capacitance between VISI circuit and ground plane (claim 1, measure electrical characteristic).

As to claim 23, Borgoin et al disclose (figs 2 – 4) the MEMS cantilevers (420) and the VLSI circuit interconnects are within a vacuum chamber (491).

As to claims 24, 42, Borgoin et al disclose (figs 2 – 4) the system utilized to characterize at least one of resistance and capacitance of a transistor (441).

As to claims 25, 26, Borgoin et al disclose (figs 2 – 4) a distance between VLSI circuit interconnects is less than 0.2 micron and a length of VLSI is less than 10 micron (this is an optimum value of a result effective variable involves only routine skill in the art).

As to claims 27, 28, Borgoin et al disclose (figs 2 – 4) the system wherein at least a portion of a first VLSI circuit interconnect to be tested is on a disparate layer compared to a second VLSI circuit interconnect to be tested and the VLSI circuit interconnects are covered by a layer of dielectric.

As to claims 30, 31, Borgoin et al disclose (figs 2 – 4) the system wherein the computing component calculates a coupling capacitance between VLSI circuit interconnects based at least in part upon the measured deflection characteristics and computing component calculates a capacitance of a VLSI circuit interconnect that is not contact by the first MEMS cantilever with respect to ground.

As to claims 33, 34, 41, 45, Borgoin et al disclose (figs 2 – 4) the method further comprising computing coupling capacitance between the two adjacent VLSI circuit interconnects based at least in part upon the measured oscillations

As to claims 35, 36, 39, 40, Borgoin et al disclose (figs 2 – 4) the method further comprising:

Providing a first voltage to a first MEMS cantilever (420) with a frequency substantially similar to one half of at least one of natural resonant frequency and a user selected frequency of the first M=EMS cantilever and
Grounding a second MEMS cantilever.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jimmy Nguyen whose telephone number is 571-272-1965. The examiner can normally be reached on M-F from 9 to 5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ramtez Nestor, can be reached on 571-272-2034. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.


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Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jimmy Nguyen

8/4/05


VINH NGUYEN
PRIMARY EXAMINER
A.U. 2829
08/08/05